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TRAP-LANTERN RECORD AT ITHACA, NEW YORK (LEPIDOPTERA)

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The present paper gives seasonal records at Ithaca, a typical locality in the Alleghanian (eastern Transition) zone, for the commoner species of Lepidoptera taken at light in a trap in the seasons of 1919 and 1922.

These two seasons give a fair representation of weather conditions in the region. 1919 was normal, though perhaps on the whole a little dry, and shows the usual tendency in west-central New York for a summer falling off of flights, many species having only a single brood in the late spring. On the other hand, 1922 was abnormally wet, and very steadily so, giving favorable conditions for a second brood in many species which were single brooded in 1919, and in general much heavier flights in the summer. Numerous species also appeared which are rarely taken at Ithaca, some of them in numbers.

It has seemed best to give the seasonal records in the form of plots. In each case the numbers of specimens caught were added together by weeks, and the height of the column for each week corresponds to the catch of that week. The vertical scale used in most cases is approximately .6 mm. per specimen. The following are given on half scale: *Diacrisia virginica, Feltia venerabilis, Agrotis bicarnea, Leucania luteopallens, Lithacodia carneola, Zanclognatha lituralis, Chytolita morbidalis* (1919), *Plathypena scabra* (1919), *Datana integerrima* and *contracta* (1922) *Heterocampa guttivitta* (1919), *Cleora ephyraria, Xanthotype crocataria, Phlyctaenia ferrugalis, P. terrealis, P. tertialis, P. pertextalis, P. fissalis, P. aeglealis, Galasa nigrinodis, Crambus alboclavellus, C. hortuellus* (1922), *C. albellus, Platyptilia pallidactyla, Metzneria lappella, Eulia velutinana* and *Gracilaria superbifrontella.* The following, on account of the large numbers captured, are plotted on still smaller scales: *Feltia ducens, F. herilis, Noctua baja* (1922), *Nephelodes emmedonia, Cirphis pseudargyrea,* (1922), *Epizeuxis aemula* (1922), *Zanclognatha jacchusalis* group (1922), *Chytolita morbidalis* (1922), *Symmerista albifrons,* (plot by weeks), *Synelys enucleata* (1922), *Physostegania pustularia, Nepytia canosaria, Ennomos subsignarius* (1922), *Nematocampa filamentaria, Sabulodes lorata* (1919), *S. transversata* (1922), *Evergestis straminalis* and *Crambus hortuellus* (1919).

In the Macrolepidoptera all the species of which ten or more specimens were taken in either year, are plotted; in the Microlepidoptera plots are only shown of a few of the commonest forms and the two years are not as a rule plotted separately, unless they showed some marked difference in time of flight.

In those cases where only one year justified a plot the dates of records on the other year are indicated by open circles.

The records for the middle part of the year are practically complete, though occasionally a few very rubbed specimens were not counted. The 1919 record was interrupted for about two weeks in September, and has been hypo-

thetically filled out on the graphs by a dotted area in the case of two or three fall species. In 1922 records were stopped in the middle of October. Mr. L. P. Wehrle cared for the trap in 1919, and Mr. Henry Good for the greater part of 1922. The latter also made the counts of the commonest species, saving all about which there was any question, for the writer. Aside from that, the writer is responsible for all determinations.

The total catch amounted to over 8,000 specimens in 1922, when a 500 watt tungsten light was used; in 1919, with a weaker light about 5,000 specimens were taken; but among them very few of the smaller Microlepidoptera.

The trap was located at the same spot both seasons, on the north slope of the Agricultural campus, so as to be protected from north winds by the woods, woods, but sending its light over a considerable area of open land on the top of the hill.

For convenience the list is arranged according to Barnes and McDunnough's List of Lepidoptera.

Complete records are preserved in the files of the Entomological department of Cornell University, as experiment 1030.

List of Captures

710 *Cressonia juglandis* Abbot and Smith. 27 specimens; one brood in June (Chart 1, 1919).

780 *Automeris io* Fabricius. 21; 1 brood in June. A single specimen on July 15, 1922 indicates an attempt at a second brood (Chart 1, 1919).

802 *Anisota rubicunda* Fabricius. 36; 1 brood in June (Chart 1, 1919).

856 *Crambidia pallida* Packard. 16; 1 brood in August. Strange to say, no Lithosiidae at all were taken in 1919. In 1922 there were also taken 8 *Hypoprepia fucosa* in July (Chart 1, 1922).

921 *Halisidota tessellaris* Abbot and Smith. 30; 1 brood in July. Only four of the specimens were taken in 1919, and all of these in June, before the usual summer drought came on. (Chart 1, 1922.)

953 *Diacrisia latipennis* Stretch. 26; 1 brood in June. Only two of these were taken in 1922 (Chart 1, 1919).

954 *Diacrisia virginica* Fabricius. In 1919: 56; one brood with climax at June 6, and 6 stragglers, representing the second brood. In 1922: 125; two broods with climax at June 6 and August 5. The differing history in the two years is striking, but is repeated in the case of *E. acraea, H. pseudargyrea, L. carneola* and several others. (Chart 1, 1919 and 1922.)

957 *Isia isabella* Abbot and Smith. In 1919: 12; one brood, with climax about June 17. In 1922: 13; one brood with climax June 7. This is the first of a number of late spring species that flew earlier in 1922, but the difference is not large (Chart 1, 1919 and 1922).

960 *Estigmene acraea* Drury. 1919: 21; one brood with climax June 17, and a couple of stragglers in August to represent the second brood. 1922: 35; two fully developed broods, the first straggling, but at its maximum late in May, the second in August. (Chart 1, 1919 and 1922).

1397 *Feltia venerabilis* Walker. 45; one brood in September. This was not taken at all in 1919, but a small flight may have been missed when the trap was not running. (Chart 1, 1922.)

1402 *Feltia ducens* Walker. 103; one brood in August. (Chart 1, 1922.)

1403 *Feltia subgothica* Haworth (*tricosa*). 15; one principal flight, in July, and a smaller one in August. The specimens were of the more typical form with base of hind wing markedly pale. The charts would suggest that this species is double brooded and *herilis* is a partially seasonal form, but it hardly seems possible, considering the slow rate of growth of most cutworms. The life history of this group needs investigation. (Chart 1, 1922).

1404 *Feltia herilis* Grote. 1919: 16; one brood with a few early stragglers. 1922: 92; one well marked brood, with climax August 23, and a small early flight with *F. subgothica.* (Chart 1, 1919 and 1922.)

1424 *Agrotis c-nigrum* Linnaeus. 64; three flights, with climax about July 8, August 18 and September 18. Only two broods are to be expected, and the meaning of the double flight in the fall is not clear. The few specimens in 1919 almost all belonged to the first brood. (Chart 1, 1922.)

1425 *Agrotis bicarnea* Guenee. 36; one brood in August. This species and the following were also rare in 1919. They presumably æstivate in the larva like *A. baja,* and have no early summer flight at all under central New York conditions. (Chart 1, 1922.)

1428 *Agrotis normaniana* Grote. 23; one brood in August, like the preceding and following. (Chart 1, 1922.)

1430 *Noctua baja* Fabricius. 70; the damp summer seems to have been favorable and to have brought it out of æstivation a week early in 1922. (Chart 2, 1919 and 1922.

1750 *Polia* (*Mamestra*) *renigera* Stephens. 24; flight irregular, from May to October. The contrast between this species (the bristly cutworm) and *P. lorea* is striking. Presumably there is more than one brood, but nothing can be proved by the graph. (Chart 2, 1922.)

1754 *Polia* (*M.*) *lorea* Guenee. 55; one brood at end of June. The different flight curves for the two years have no obvious meaning. (Chart 2, 1919 and 1922.)

1798 *Chabuata signata* Walker. 18; one brood in August. Only two specimens were taken in 1919. (Chart 2, 1922.)

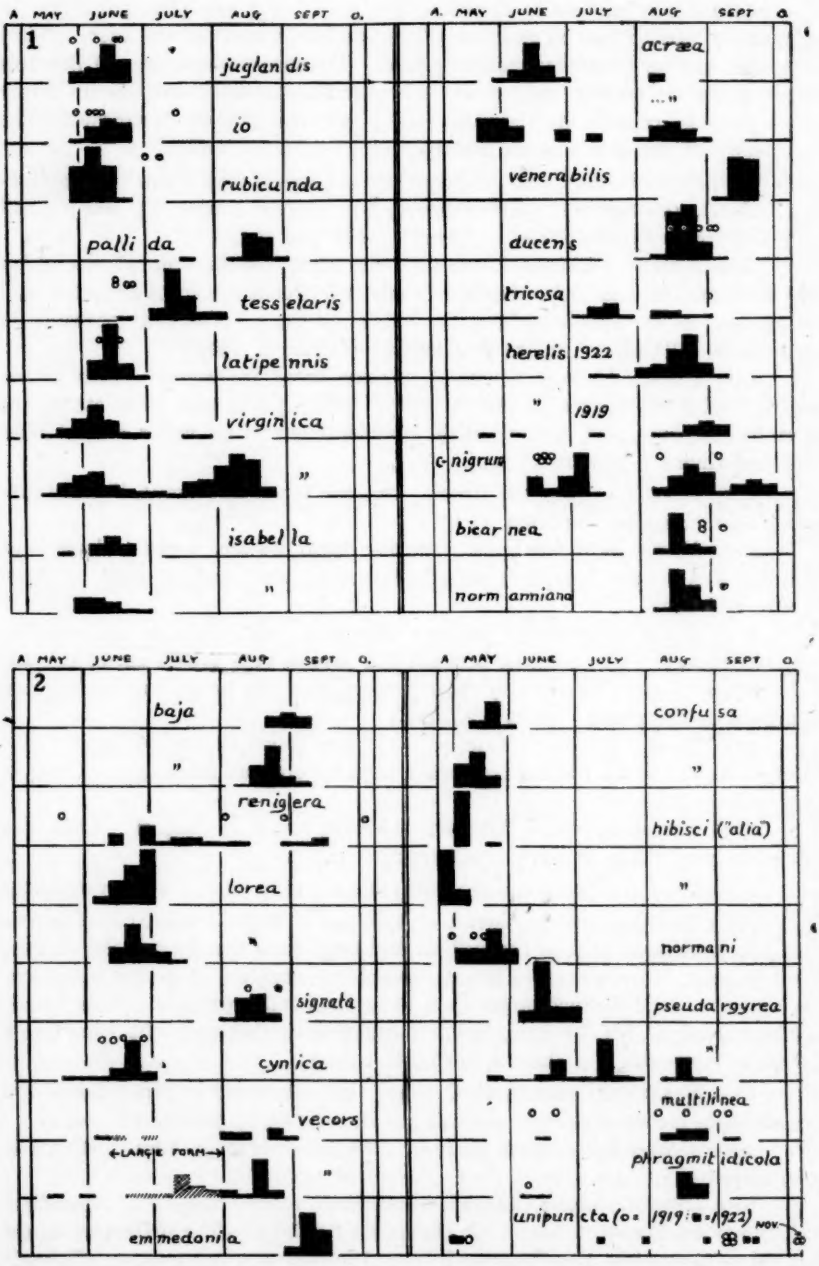
1839 *Eriopyga cynica* Guenee. 22; one brood in June. (Chart 2, 1922.)

1842 *Eriopyga vecors* Guenee. 1919: 11; flight irregular. The two later June specimens were of the well marked large form that formed the summer brood in 1922. 1922; 31; two broods, and early stragglers of the autumn form. The summer brood is much larger than spring and fall specimens. This species has been bred by Mr. Wehrle, and is a cutworm in habits. Its life history should be interesting. (Chart 2, 1919 and 1922.)

1866 *Nephelodes emmedonia* Cramer. 58; one brood in September. The time of flight comes when the trap was not running in 1919 (Chart 2, 1922).

1878 *Morrisonia confusa* Hubner. 28; one brood in May. (Chart 2, 1919 and 1922.)

1919 *Orthosia hibisci* Guenee (*Graphiphora alia*). 1919: 17; one flight with climax on May 4. 1922: 19; climax on April 25. The difference in the two years may not be significant as in 1922 the trap was not running efficiently in April (Chart 2, 1919 and 1922.)



TRAP LANTERN RECORDS.

1927 *Sideridis normani* Grote. 24; one brood with climax May 22. Only three specimens appeared in 1922. (Chart 2, 1919.)

1933 *Cirphis pseudarygria* Guenee. 1919: 27; one brood in June. 1922: 96, three flights with climax about June 20, July 15 and August 18. The contrast in the two seasons is striking. The July flight in 1922 was wholly of dwarf specimens, the August flight practically normal. (Chart 2, 1919 and 1922.)

1934 *Cirphis multilinea* Walker. 16; one well marked brood in August, and indications of another in June. The numbers are too small to be significant. (Chart 2, 1922.)

1936 *Cirphis phragmitidicola* Guenee. 14; principal brood in August. Again three June specimens would point to an early brood. (Chart 2, 1922.)

1950 *Cirphis unipuncta* Haworth. The very few specimens taken (14 in all) are extraordinarily scattered. The indication of hibernation in the imago is plain, as the early specimens are rubbed. The species also hibernate in the larva, and I understand, other stages. There are supposed to be about two broods. (Chart 2, 1919-1922.)

1972 *Leucania luteopallens* Smith. 65; two broods, in June, and in August and September. In this case the June brood is the principal one, and the fall brood is presumably partial. (Chart 3, 1919 and 1922.)

2216 *Conistra indirecta* Walker. 18; one brood in October to May. (Chart 3, 1919.)

2220 *Amathes bicolorago*, form *ferrugineoides* Guenee. 58; one brood in late fall. (Chart 3, 1922 plotted.)

2239 *Amphipyra pyramidoides* Guenee. 16; presumably one brood from August to October. (Chart 3, 1922.)

2291 *Trachea finitima* Guenee. 47; one brood in June. (Chart 3, 1919 and 1922.)

2327 *Perigea vecors* Guenee. 33; one flight, with climax about August 6. This species is suspected of being migrant, and some of the specimens may be from the south. It was not taken in 1919. (Chart 3, 1922.)

2344 *Agroperina dubitans* Walker. 75; one brood, with climax about August 10. The heavy flight was presumably due to the favorable season of 1922; the species is not common at Ithaca. (Chart 3, 1922.)

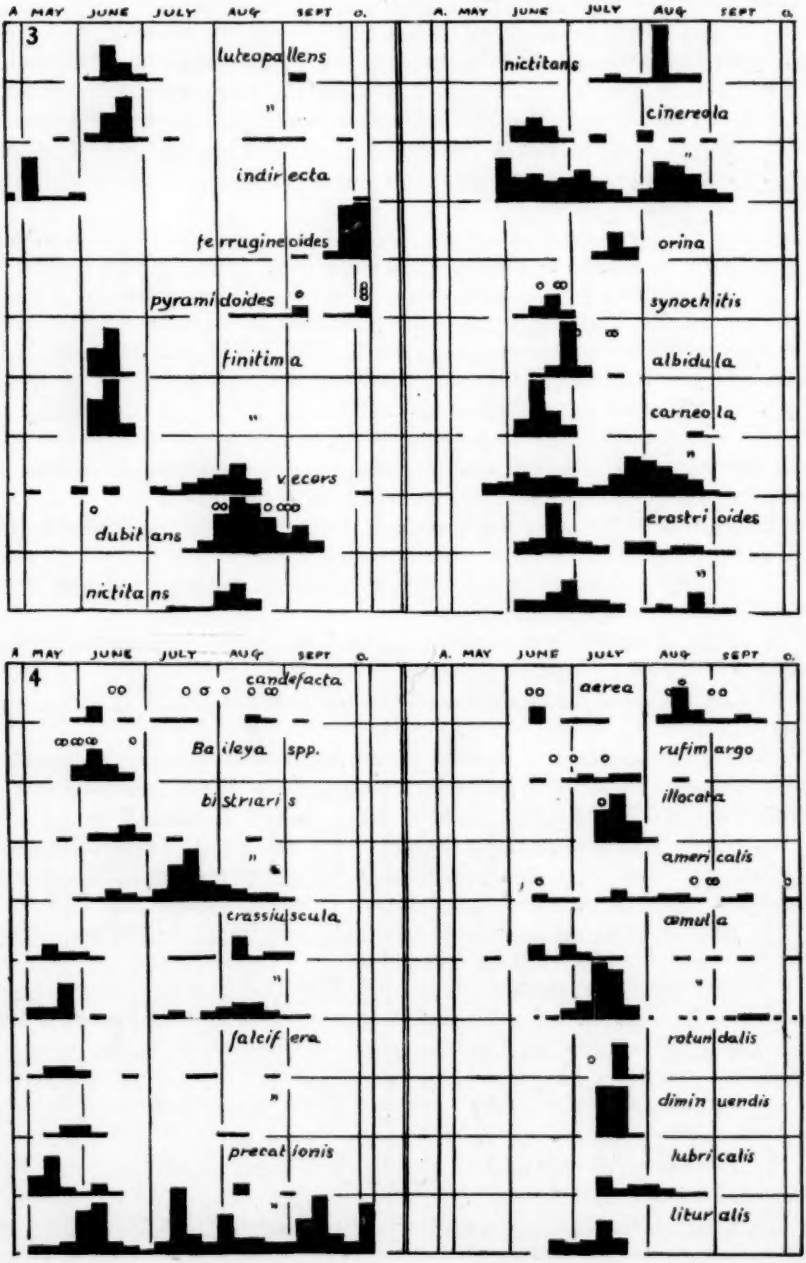
2638 *Apamea nictitans* Linnaeus. 42; one brood, with climax about August 10. (Chart 3, 1919 and 1922.)

2704 *Ogdoconta cinereola* Guenee. 1919: 22; one well marked brood in June and stragglers in midsummer. 1922: 86; two broods, the first very heavy in June and most of July, the second in August. (Chart 3, 1919 and 1922.)

2735 *Cosmia orina* Guenee. 12; one brood in July (not taken in 1919) (Chart 3, 1922.)

2894 *Lithacodia synochitis* Grote and Robinson. 13; one brood in June (Chart 3, 1919.)

2895 *Lithacodia albidula* Guenee. 29; one brood, with climax June 29. In warmer regions the flight continues through August, and there are doubtless two broods. (Chart 3, 1919.)



TRAP LANTERN RECORDS.

2900 *Lithacodia carneola* Guenee. 1919: 67; one brood in June and 7 stragglers in July and August. 1922: 154; two broods, with climax in June and about August 1. The large numbers of this species make the extreme contrast between the two years more significant. (Chart 3, 1919 and 1922.)

2952 *Tarachidia erastrioides* Guenee. 79; two broods, at end of June and in August. The second brood is relatively heavier in 1922, but the contrast with the preceding species is striking. (Chart 3, 1919 and 1922.)

2956 *Tarachidia candefacta* Hubner. 22; flight irregular, presumably indicating two broods like *erastrioides*. (Chart 4, 1922.)

301- *Baileya* species. 24; one flight in June (Chart 4, 1919.)

3127 *Parallelia bistriaris* Hubner. 63. There would appear to be a light spring brood in June, which in 1922 was followed by a heavy second brood in July; but the flight record is not clear. (Chart 4, 1919 and 1922.)

3136 *Caenurgia crassiuscula* Haworth. 61; two broods, in May and August. As it is well known the first brood is undersized. A few specimens of *erechtea* may have been included; but the flights of the two are identical anyway. (Chart 4, 1919 and 1922.)

3230 *Autographa falcifera* Kirby (including *simplex*). 23; one well-marked brood in May and stragglers later. There are supposed to be two or three broods. (Chart 4, 1919 and 1922.)

3261 *Autographa precationis* Guenee. 1919: 30; one well marked brood in May and stragglers in July. 1922; 132; five distinct flights, presumably representing three broods; climaxes about June 7, July 10, August 1, Sept. 10 and October. This species obviously took advantage of the favorable season to increase enormously. (Chart 4, 1919 and 1922.)

3276 *Plusia aerea* Hubner. 32; two flights, in June and August. (Chart 4, 1922.)

3352 *Panapoda rufimargo* Hubner. 13; apparently one brood in midsummer (Chart 4, 1922.)

3475 *Dyspyralis illocata* Warren. 27; one flight in July. This and the following Herminiine deltoids hardly occurred at all in 1919; apparently the wet weather of 1922 agreed with them. Most of the few larvae known feed on dead leaves in damp woods. I think this note is the first published on the seasonal history of the majority.

3485 *Epizeuxis americalis* Guenee. 24; straggling along all summer. (Chart 4, 1922.)

3486 *Epizeuxis aemula* Hubner. 1919: 18; one well marked brood in June, followed by a few stragglers. 1922: 185; a heavy brood in July and a partial second in September. Evidently this species took advantage of the moist July for an enormous increase; the second brood may have been missed in 1919. (Chart 4, 1919 and 1922.)

3490 *Epizeuxis rotundalis* Walker. 11; one brood in July. (Chart 4, 1922.)

—— *Epizeuxis diminuendis* Barnes and McDunnough. 27; one brood in July. (Chart 4, 1922.)

3496 *Epizeuxis lubricalis* Geyer. 17; one brood in July and August. The straggling flight of this species is in contrast with the concentrated seasons of the last two.

3499 *Zanclognatha lituralis* Hubner. 43; one brood, centering about July 10. (Chart 4, 1922.)

3502 *Zanclognatha inconspicualis* Grote. 33; one brood, about July 10. (Chart 5, 1922.)

3503 *Zanclognatha laevigata* Grote. 58; one brood in July. All the named forms and some others were represented.

3506 *Zanclognatha pedipilalis* Guenee. 41; one brood in June. This species is markedly earlier than the *jacchusalis* group in both years. (Chart 5, 1919 and 1922.)

(To be continued.)

SAWFLIES FROM ALBERTA (TENTHREDINIDAE)*

BY ALEX D. MACGILLIVRAY,
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The following new species constitute a part of a collection of saw-flies, Tenthredinidae, received from Mr. A. M. Wolcox of Wellesley, Massachusetts. The specimens were all collected at Edmonton, Alberta, Canada, by Mr. F. S. Carr. There is a surprising number of new species in the collection, particularly for one of its size. When many more specimens are available from this region, some or all of the nematids described as new may prove to be the same as some of the species described by Norton from the Mackenzie River region. The types of all these species unfortunately are lost.

Empria cava MacG.

Empria cadurca n. sp.

Female. Body black with the margin of the pronotum white and the front legs beyond the middle of the femora and the other legs beyond the knees, yellowish-white; antennae with the third segment longer than the fourth, the fourth and fifth subequal; the clypeus emarginate, clypeal tooth pointed, clypeal lobes long, angular; supraclypeal area convex; ocellar basin long, narrow, and deep; median fovea a round pit; vertical furrows deep, linear; postocellar area distinct; saw-guides broad, bluntly truncately rounded; wings slightly smoky, veins and stigma and costa black, setae distinct. Length, 6 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is related to *cava*, from which it is easily separated. The male does not differ from the female.

Dolerus nuntius n. sp.

Female. Body black with abdominal segments one to five rufous; the knees and front tibiae in certain lights with a rufous shading; antennae with the third segment longer than the fourth, the fourth and fifth subequal; front and facial orbits finely densely punctate, finer and more densely than on the post-ocellar area and vertical orbits, furrow behind compound eyes present only adjacent to eyes, transverse furrow adjacent to occiput indicated; vertical furrows distinct, elongate; median lobe of mesonotum with each lateral half densely punctate, mesal portion and lateral lobes uniformly punctate; mesoscutellum coarsely punctate; scutellar appendage longitudinally striate; saw-guides broad,

*—Contributions from the Entomological Laboratories of the University of Illinois No. 81.

obliquely truncate; wings smoky, veins and costa black; stigma partly pale. Length 7 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is related to *nectareus*.

Dolerus nutricius n. sp.

Male. Body black with abdominal segments one to six and the tibiae, rufous; antennae with the third and fourth segments subequal, the fourth longer than the fifth; the front and facial orbits uniformly densely punctate, the postocellar area not so densely punctate, vertical orbits with a polished area; median lobe of mesonotum with each lateral third densely punctate, median third with small sparse punctures; lateral lobes of the mesonotum polished, almost impunctate; scutellum punctate; mesoscutellar appendage longitudinally striate; wings smoky, veins, stigma and costa black. Length 6 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is near *nectareus* and *nuntius*.

Dolerus nummatus n. sp.

Female. Body black with the pronotum in part, tegulae, abdominal segments one to five, front tibiae, and the knees and more or less of the middle legs; antennae with third segment longer than the fourth, the fourth and fifth subequal; the front and facial orbits coarsely punctured, postocellar area more or less corrugated, vertical orbits with a transverse impunctate area; transverse furrow limited adjacent to compound eyes, the transverse furrow adjacent to the occiput distinct; mesonotum sparsely generally punctate, each lateral third of median lobe more densely punctate than the median portion; mesoscutellum punctate; the appendage of the mesoscutellum longitudinally striate; saw-guides broad, stout, obliquely truncate; wings hyaline, spinulae distinct, veins and costa blackish, stigma partly pale. Length 8 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species belongs near *nocivus*.

Dolerus nundinus n. sp.

Male. Body black with abdominal segments one to five rufous; antennae with third, fourth, and fifth segments subequal; front and facial orbits finely densely punctate; postocellar area not so densely punctate and vertical orbits polished with a few large shallow punctures; mesonotum punctate, sparsely except each lateral third of median lobe which is closely punctate; mesoscutellum coarsely punctate; scutellar appendage longitudinally striate; wings hyaline, veins and costa and stigma black. Length, 7 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is related to *nemorosus* and *negotiosus*.

Dolerus nummarius n. sp.

Female. Body black with abdominal segments one to five and the knees of the first pair of legs rufous; antennae with the third segment longer than the fourth, the fourth longer than the fifth; front and facial orbits finely densely punctate, postocellar area not so densely; vertical orbits with polished area with coarse punctures, a short furrow adjacent to each compound eye, and a small furrow along the caudal margin of the head; mesonotum punctate, median lobe

densely, particularly each lateral third, disk of lateral lobes polished with fewer punctures; mesoscutellum punctate, scutellar appendage longitudinally striate; saw-guides broad, obliquely truncate; wings slightly smoky with the veins and stigma and costa black. Length, 8 mm.

Habitat:—Edmonton, Alberta; F. A. Carr, collector. This species falls

Pacyprotasis rapae Linnaeus.

Rhogogastera evansii Harrington.

Rhogogastera ruga n. sp.

Female. Body greenish-yellow with the following parts black: An oval area surrounding the ocelli and not including the ocellar areas, the caudal aspect of the head, except the peripheral portions, the lobes of the mesonotum except wedge-shaped marks on the median and two on each lateral lobe, the scutellum, and the metascutellum, a broad transverse band on the basal plates and abdominal terga one to seven, and the margins of the saw-guides; the legs beyond the coxae, except the tarsi, with a black line above, the posterior coxae above, and a ring on the distal end of each tarsal segment; clypeus narrowly deeply emarginate, clypeal lobes comparatively broad; antennal plates small and inconspicuous, ocellar basin shallow, ocellar areas broad; postocellar area distinct; antennal furrows continuous; antennae with the third segment longer than the fourth, the fourth longer than the fifth; saw-guides broad, stout, dorsal margin straight, ventral and distal margins convex; wings hyaline, costa and stigma greenish, veins black. Length 10 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is related to *respectus*.

Tenthredo erythromera Provancher.

Tenthredo nigrisoma Harrington.

Tenthredo scaevola Cresson.

Tenthredo rutila n. sp.

Female. Body black with the following parts yellow: The clypeus, labrum, mandibles, tegulæ, spot above the posterior coxae, front legs beyond the trochanters, the middle legs beyond the coxae except a spot on the apices of the femora, and the hind legs beyond the trochanters except a band on the upper side of the femora, the distal end of the tibiae, and most of the tarsi; abdominal terga and sterna yellowish-rufous; clypeus broadly emarginate; ocellar basin broad and deep; postocellar area quadrangular; antennae with the third segment longer than the fourth, the fourth longer than the fifth; the lobes of the mesonotum punctate; saw guides straight above, bluntly rounded below; wings slightly smoky with the veins and the stigma and the costa black. Length, 11 mm.

Habitat—Edmonton, Alberta. This species is very similar in general appearance to *bifasciata* Say.

Tenthredo rumina n. sp.

Female. Body black with the following parts yellow: the clypeus, labrum, mandibles, pedicel of antennae, indefinite marks on occipital orbits, collar, tegulae, scutellum, spot above posterior coxae, basal plates for the most part, front legs beyond the coxae except the distal half of the femora, a ring

on the tibiae, and their tarsi above, more or less; abdomen with the tergum and sternum of the fourth segment rufous, terga of the sixth and seventh segments with lateral yellow marks, and the eighth segment wholly yellow; clypeus narrowly emarginate; antennal plates distinct, black, not large; ocellar basin almost wanting, a fovea adjacent to the median ocellus; antennal furrows distinct; antennae with the third segment longer than the fourth, the fourth longer than the fifth; saw-guides convexly rounded on dorsal and ventral margins; wings smoky, costa and stigma pale, veins blackish. Length, 10 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is very similar to *Allantus basilaris* Say.

Abia kennicotti Norton.—A male specimen agrees perfectly with the description of Norton.

Cimbex violacea St. Fargeau.—A single female specimen that agrees with the description of W. F. Kirby. It is not a distinct species but a variety of *Cimbex americana* or *Cimbex pacifica*. There have not been sufficient specimens examined to answer the question, but it looks as if the two species of Cresson, *rubida* and *pacifica*, were southern and northern forms of the same species respectively. *Pacifica* occurs in north-west Canada and is probably only an extreme variety of the eastern *americana*. If *semidea* should prove to be only a variety of *americana*, there would then be only a single species of *Cimbex* in North American with a long series of very different varieties.

Trichiosoma confundum n. sp.

Female. Body black with the abdomen beyond the first segment and the legs beyond the femora, rufous; antennae with the third segment elongate, longer than four and five together, segments six and seven distinctly separated, seventh marked near distal end with an inconspicuous suture; head and thorax densely covered with long grayish setae, abdomen nearly bare or with very short setae; clypeus broadly emarginate; labrum blunt, bluntly rounded, setiferous; saw-guides broad, bluntly rounded, apex at middle; wings infuscated, costa and veins yellowish, stigma black. Length, 12 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species runs to *confusum*.

Blennocampa amara n. sp.

Female. Body black with the labrum, clypeus, collar, tegulae, and legs beyond the middle of the femora, yellow; antennae with the third segment longer than the fourth, the fourth and fifth subequal; clypeus truncate; median fovea a broad shallow depression; lateral foveae not sharply marked, continuous with the antennal furrows; ocellar basin represented by a depression below the median ocellus; postocellar area limited, interocellar suture distinct; mesonotum polished; saw-guides broad, obliquely truncate, dorsal margin straight; wings infuscated, veins and stigma and costa black. Length, 4 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species runs to *abnorma*.

Pteronidea egeria n. sp.

Female. Body black with the following parts shading from white to rufous: the clypeus, labrum, mandibles, genal orbits, continued as a line on to

occipital orbits, and irregularly expanded on vertical orbits, collar, edge of tegulae, front and middle legs beyond the middle of the femora, and the knees and tibiae of the posterior legs; clypeus roundly emarginate, clypeal lobes rounded; median fovea elongate, deep; frontal crest short, stout, unbroken; walls of pentagonal area broadly rounded, ocellar basin shallow, deepest near frontal crest; saw-guides stout, ventral margin oblique, bluntly rounded; wings hyaline, costa and stigma pale, veins blackish. Length, 7 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is near *pacificus*.

Pteronidea egnatia n. sp.

Female. Body black with the following parts white, on some parts suffused with rufous: the clypeus, labrum, mandibles, supraclypeal area, a band on all the orbits, expanded on the vertical orbits, angles of pronotum, tegulae, spot on mesopleura, sterna of abdomen, tergum of caudal segment, and the legs except the hind tarsi more or less; antennae with the third segment longer than the fourth, the fourth and fifth subequal; clypeus deeply emarginate, clypeal lobes rounded; median fovea large, deep, extending through and dividing the frontal crest; walls of the pentagonal area distinct; saw-guides with converging margins, bluntly pointed; wings hyaline, costa and stigma pale, veins blackish. Length, 8 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is related to *hyalinus*.

Pteronidea elelea n. sp.

Female. Body yellowish with an imperfect black spot about ocelli, a small spot on each lateral lobe of the mesonotum, an elongate oval dot on each side of the meso scutellum, and a line in the suture at the caudal margin of the metascutellum and the basal plates; the antennae irregularly fuscous above, the third and fifth segments subequal in length, the fourth longer; the clypeus broadly and shallowly emarginate; median fovea broad with sloping sides; frontal crest distinct, broadly, slightly broken; walls of pentagonal area distinct; ocellar basin deep, triangular; saw-guides elongate, oblique, bluntly pointed; wings hyaline, costa and stigma pale, veins blackish. Length, 7 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is similar to *mendicus* but lacks much of the black found on specimens of this species.

Pachynematus allegatus n. sp.

Female. Body black with the following parts yellowish: The clypeus, labrum, mandibles, supra-clypeal area, occipital and vertical orbits, more or less rufous, angles of pronotum, tegulae, abdomen above beyond first segment and sternum except saw-guides, and legs; antennae with the third and fourth segments subequal, longer than the fifth; clypeus deeply emarginate, clypeal lobes broadly rounded; median fovea deep, longer than broad; frontal crest strongly elevated, unbroken; walls of pentagonal area sharp, ocellar basin flat, pentagonal; saw-guides stout, strongly projecting, oblique and truncated; wings hyaline, costa and stigma pale, veins blackish. Length, 7 mm.

Habitat:—Edmonton, Alberta; F. S. Carr, collector. This species is related to *punctulatus*.

NEW CANADIAN LEPIDOPTERA*

BY J. MCDUNNOUGH,
Ottawa, Ont.

Euxoa dodi sp. nov.

Primaries narrow, rather even gray (in older specimens with a brownish tinge) with clear cut maculation; usual lines black, geminate, pale-filled; basal half-line dentate, t. a. line straighter than usual, almost perpendicular to inner margin, with slight inward angles of the outer line on the cubitus and vein 1; claviform a long black loop, orbicular oval, almost round, partially outlined in black with filling slightly paler than ground color, reniform broad, stumpy, not much excavated on outer margin, outlined in black; t. p. line excurved below costa, then inwardly oblique and dentate; s. t. line pale, irregular, emphasized by the terminal area which is darker than the remainder of wing; at times slight black triangles precede the s. t. line in its central portion; a broken black terminal line; fringes with a pale ochreous basal line followed by a smoky one, remainder pale smoky. Secondaries whitish with a smoky tinge and traces of a darker terminal band. Expanse 30-32 mm.

Holotype—♂, Lethbridge, Alta., Aug. 17, 1915, (E. H. Strickland), No. 608, in the Canadian National Collection, Ottawa.

Allotype—♀, Lethbridge, Alta., Aug. 23, 1915, (E. H. Strickland), in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, Lethbridge, Alta., Aug. 27, 1922, (H. L. Seamans); Calgary, Alta., Aug. 16, 1901, (F. H. Wolley-Dod).

The species is apparently rare as the above four specimens represent the total catch over a period of more than 20 years. The Calgary specimen bears labels doubtfully identifying it as *diffórmis* Sm. or a pale variety of *intrita* and in the Dod Collection, as it came to us, was placed under *mercedes* B. & McD. Mr. Benjamin, to whom specimens were submitted, could not satisfactorily place it by comparison with species in the Barnes Collection. It may eventually prove to be one of Smith's obscure species, but in the meantime, it seems best to give it a definite name.

In the male genitalia the inner branch of the harpe is three-fifths the length of the outer branch, and heavily clothed with short hairs; the outer branch tapers to a point, is slightly curved apically and reaches to about the level of the apex of the clasper, which is rather slender and narrow; the eversible membrane of the aedoeagus shows a small chitinous tooth.

Euxoa clausa sp. nov.

Primaries light olivaceous-ochreous, paler along costa and slightly shaded with smoky. Maculation distinct, practically identical with that of *idahoensis* but generally better defined. A black basal streak, a black t. a. line with a prominent outward bulge above inner margin; claviform a black loop, orbicular oblique, pale-filled, reniform smoky, outlined by a pale line, edged with black; cell around and between spots slightly tinged with smoky; t. p. line black, generally quite distinct, bent outwards below costa, then inwardly oblique and dentate; s. t. line pale, irregular, preceded by black arrow-marks; a broken terminal

*—Contribution from Division of Systematic Entomology, Entomological Branch, Dept. of Agriculture, Ottawa.

black line; fringes pale smoky with ochreous line at base. Secondaries light smoky in both sexes with distinct discal lunule.

Holotype—♂, Lethbridge, Alta., July 21, (E. H. Strickland; No. 598, in the Canadian National Collection, Ottawa.

Allotype—♀, Lethbridge, Alta., July 15, (E. H. Strickland); in the Canadian National Collection, Ottawa.

Paratypes—1 ♂, Lethbridge, Alta., July 5, (E. H. Strickland); 1 ♂, Lethbridge, Alta., July 19, (H. L. Seamans); 2 ♀, same locality and collectors, July 17 and 26.

The peculiar olivaceous tinge on the primaries separates *clausa* from the gray forms of *idahoensis*, of which, however, it may be merely a semi-desert form. I have only seen the species from Lethbridge, where typical *idahoensis* also occurs and is readily separable. In the male genitalia the clasper of *clausa* is narrower and slightly longer than that of *idahoensis* and the forks of the harpe are more slender, especially the outer one at the base, giving the harpe a more even U-shaped appearance. I use a manuscript name, given by the late F. H. Wolley-Dod, who had tentatively separated off two specimens in his collection.

PYRALIDAE

Crambus edmontellus sp. nov.

Male. Very similar to *laciniellus* Grt. but slightly larger, less evenly ochreous in color and with the outer margin of primaries decidedly more bulging below the apex of wing. Primaries pale to dark ochreous; with the exception of the basal half of the costal area this color is generally hidden by a heavy sprinkling of grayish-white scales mingled with a few blackish ones; at times the blackish scales predominate, producing a much darker appearance. Vein 1 and the cubital vein ochreous and prominent across the pale areas; other veins beyond the cell whitish with similarly colored parallel interspaceal lines, giving a more distinct striate appearance to the outer wing area than is found in *laciniellus*. Traces of cross lines as in *laciniellus*, i. e., a very oblique brownish streak above the inner margin at middle and a more distinct brown sub-terminal line, outcurved below costa, prominently angled on vein 2 and bulging outwardly above anal angle. Three or four faint black terminal dots just below veins 2—5. A whitish, slightly shining line at base of fringes; remainder duller and darker in color, composed of an admixture of white and pale brown scales. Secondaries pale, considerably suffused with smoky in outer half; fringes white, cut by a smoky line at base. Expanse 25 mm.

Female. What I take to be the female of the species is considerably larger and paler than the male, the primaries being whitish, suffused with light ochreous and with indistinct maculation. The secondaries are almost pure white. Expanse 30 mm.

Holotype—♂, Edmonton, Alta., July 26, (K. Bowman); No. 597, in the Canadian National Collection, Ottawa.

Allotype—♀, N.W.T., 1907, (J. Fletcher); in the Canadian National Collection.

Paratypes—4 ♂, Edmonton, Alta., July 14, 18, 28, Aug 1, (K. Bowman); 1 ♂, Calgary, Alta., July 5, (K. Bowman); 1 ♂, 1 ♀, Lethbridge, Alta., June 29, 30, (H. L. Seamans); 2 ♂, 2 ♀, N.W.T., 1907, (J. Fletcher); all in the

Canadian National Collection except the first mentioned, which is in Collection Bowman.

The ♂ genitalia are distinct from those of *laciniellus;* in this latter species there is a well developed accessory spine at the base of the harpe, which in *edmontellus* is very greatly reduced.

EUCOSMIDAE

Argyroploce dextrana sp. nov.

Male. Very similar in color to *removana* but with dark banding of primaries better defined, due to white scaling in antemedian and terminal areas. The thoracic tuft is not brown-tipped nor is there a brown patch of scaling at base of primaries. A distinct quadrate dark patch on costa near base, the edges continued across wing by waved dark lines; beyond this patch the costal area up to the median dark band is noticeably paler; median dark band indistinct, very irregular, contracted below costa, angled inward on the submedian fold, partially defined on inner area of wing by fine black lines, which are entirely lacking in *removana;* a thin curved dark band, defined by black lines from middle of outer margin towards costa but not attaining same; remainder of terminal area lightly sprinkled with white. Secondaries pale, shading into smoky outwardly.

Female. The single female before me shows a dark shade extending along inner half of wing from base to median band and defined towards costa by a streak of deeper shade. Expanse 17—19 mm.

Holotype—♂, Ottawa, Ont., July 28, (C. H. Young); No. 595, in the Canadian National Collection, Ottawa.

Allotype—♀, Ottawa, Ont., Aug. 5, (C. H. Young); in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, Calgary, Alta., July 27, (F. H. Wolley-Dod); Edmonton, Alta., Aug 12, (K. Bowman).

The ♂ genitalia are very similar to those of *removana* but the claspers are considerably broader apically, the ventral spined projection of the sacculus is longer and broader and the cornutus is noticeably longer and contains a slight lateral projection.

Argyroploce bowmanana sp. nov.

Primaries deep black-brown with paler bands and lines of a leaden colour and a prominent round white blotch at end of cell. Basal area leaden colored with a dark brown perpendicular line near base not reaching costa; this area is bordered by a black-brown band, outwardly oblique from costa to below cell, then almost perpendicular to inner margin, with a slight notch in its outer margin in submedian fold, broader at inner margin than at costa; beyond this dark band is the usual antemedian pale band, composed of leaden scales with a broken line of dark scales through its centre; a median dark band of even width throughout with a sharp hook-like projection on its outer side in the cell, above which rests a round white spot; below the hook is an area of leaden scales separating the median band from an oblong dark blotch on inner margin before tornus; this blotch almost touches a similarly-colored larger blotch, descending from costa before apex and formed by the union of lines arising from two small dark costal spots; above the white spot are two similar dark costal spots and the apex

of the wing contains a small, round, dark patch; a small dark patch on outer margin above tornus, the area between these dark patches being filled in with leaden or silvery scaling; fringes largely smoky with paler admixture at apex and tornus. Secondaries deep smoky with paler fringes. Expanse 15 mm.

Holotype— ♂, Nordegg, Alta., (alt. 6000 ft.) July 23, (K. Bowman); No. 607, in the Canadian National Collection, Ottawa.

Paratype— ♂, same date and collector, in the Canadian National Collection.

I take pleasure in naming this species after the collector, Mr. K. Bowman, of Edmonton, who has kindly donated the specimens to the Canadian National Collection.

TORTRICIDAE

Homona negundana sp. nov.

Primaries pale shiny ochreous crossed by median and subapical bands of a deeper brownish color. Some slight dark scaling at base of wing, giving the appearance of an obsolescent brownish basal patch; the brown median band is oblique from middle of costa to anal angle; on the outer side in the cell it sends a short projection upward toward costa and on inner side obliquely opposite this is a downward projection toward the basal dark area; in the fold this median band is much narrowed, expanding again at anal angle to a large blotch. The subapical band commences broadly at costa just before apex of wing and gradually narrows to a point on outer margin just above anal angle. The pale areas show more or less evident brownish striations. Fringes concolorous. Secondaries pure white. Expanse 18 mm.

Holotype— ♂, Aweme, Man., June 19, (N. Criddle); No. 599, in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, Aweme, Man., June 23, 27, (N. Criddle); 2 ♂, Winnipeg, Man., June 8.

The species was bred from larvae on *Acer negundo* by Mr. Criddle, but should not be confused with the somewhat similar *Cacoecia negundana* Dyar. The stalking of veins 7 and 8 of primaries at once separates it from this latter species.

Around *Cacoecia argyrospila* Wlk. are grouped several forms, agreeing closely in general type of maculation and showing no decided differences in the male genitalia; these forms seem to be closely associated with certain larval food plants, that is to say, a series of specimens bred from larvae taken on the same food plant resemble each other very closely and differ from series bred from larvae taken on other plants. In Manitoba, for instance, Mr. N. Criddle has found what seems to be typical *argyrospila* feeding on Poison Ivy whilst from larvae on *Eleagnus* he has bred a series of specimens that can be readily distinguished from the poison ivy form. Such distinctive forms seem to my mind worthy of a name and for the Eleagnus form I propose the name:

Cacoecia eleagnana sp. nov.

Similar in maculation to *argyrospila* but with the primaries much paler in color, due to the fact that the red-brown scaling is replaced by scales of a light olive-brown or olive-green; the pale costal spot beyond the median band is prominent and the pale areas between the bands show a decided silvery sheen in certain lights, more so than is usually present in *argyrospila*.

Holotype—♂, Aweme, Man., July 7, (N. Criddle); No. 600, in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—9 ♂, 1 ♀, same data.

I have before me similar specimens from Calgary, Alta., and Lethbridge, Alta., where Eleagnus also abounds; *argyrospila* also occurs at Lethbridge in the form *vividana* Dyar, described from Colorado material bred from larvae on Rubus.

Another even more distinct form than *elcagnana* was bred by me in the summer of 1922 at Algonquin Park, Ontario, from larvae found in numbers on *Myrica gale*. For this I suggest the name:—

Cacoecia myricana sp. nov.

Male. Maculation of primaries very similar to that of *argyrospila* but neater and better defined, due to the fact that the paler areas are not so suffused with brown reticulations and shades; the dark areas are deep red-brown, much as in *argyrospila*, the median band being rather cleanly cut and generally distinctly broken above the anal angle; the dark costal spot near apex is very distinct and is not connected with the median band; there is scarcely a trace of an oblique band running upwards from outer margin above anal angle. The costal spots are well silvered and this silvering extends at times over the entire pale portion of the wing producing a very striking and beautiful appearance.

Female. The two females before me have the primaries almost unicolorous red-brown with the dark banding scarcely noticeable and the pale costal spots absent.

Holotype—♂, Algonquin Park, Ont., July 4, (J. McDunnough); No. 601 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—8 ♂, 1 ♀, same data.

Cacoecia columbiana sp. nov.

Female. Palpi upturned, appressed, short, ochreous; thorax and primaries light yellow, latter with a few chestnut-brown striations at base; a broad chestnut-brown oblique band from costa before middle to anal angle, broadening out below cell, narrowed above inner margin by a tooth of ground color jutting in from basal side; an oblong chestnut-brown costal spot beyond this band, connected narrowly with same and enclosing a pale yellow spot; fringes concolorous. Secondaries pale smoky, ochreous toward apex. Beneath pale ochreous with an irregular dull purplish blotch in the central portion of primaries; secondaries paler than above. Expanse 21 mm.

Holotype—1 ♀, Salmon Arm, B. C., July 17, (W. R. Buckell); No. 603, in the Canadian National Collection, Ottawa.

Similar in general type of color and maculation to *Tortrix fucana* Wlshm., which however, is placed by Meyrick (Gen. Insect. Fasc. 149, 30) in the genus *Tortrix*, characterized by longer, porrect palpi. The preapical costal spot is also much better defined in *columbiana* that in Walsingham's figure (Ill. Lep. Het. IV, Pl. LXIII, fig. 2) and not so close to the apex of wing.

Tortrix alberta sp. nov.

Male. Palpi intermediate between typical Cacoecia-like palpi (upturned

closely appressed, short) and Tortrix-like ones (porrect, second joint heavily scaled on upper side, longer); in the present species they are upwardly oblique, not heavily scaled and not closely appressed, blackish with a few pale scales. Head and thorax pinkish ochreous suffused with black. Primaries with distinct costal fold, pale ochreous with generally a slight pinkish tinge, suffused at the base and beyond the cell partially with red-brown, leaving a broad pale antemedian band, sharply defined on each side by a deep-brown, almost band-like line, composed of an admixture of black and red-brown scaling; the inner line is rather evenly convex and broadens towards inner margin, the outer line, from before mid-costa to beyond middle of inner margin, is slightly irregular, oblique, with generally an outward bend in the cell; it originates on the costa in a more or less well defined brown patch. From the bend of this outer line a dark band extends obliquely to costa, enclosing a large pale triangular spot on costa; in the cell this band is composed of leaden-gray scaling but at costa shows red-brown scaling, this color extending broadly along costa to apex and down outer margin to just above anal angle, enclosing on costa a small, pale pre-apical spot and several black dots; the pale area at the anal angle extends upwards into this brown area in the form of an inverted U, the edges in upper portion being partially outlined by a deep brown line; the pale areas show traces of dark striae; fringes ruddy with black basal dots. Secondaries whitish with numerous dark striae, thickest outwardly, and pale pinkish fringes. Expanse 26 mm.

Holotype—♂, Nordegg, Alta., Aug. 7, (J. McDunnough), No. 602, in the Canadian National Collection, Ottawa.

Paratypes—8 ♂, same locality and collector, July 27, Aug. 1, 7, in the Canadian National Collection, Ottawa.

Tortrix trentonana sp. nov.

Palpi, head, thorax and primaries light brown, latter somewhat shiny and in certain lights showing traces of scattered brown striations. Secondaries pale smoky. Expanse 21 mm.

Holotype—♂, Trenton, Ont., June 27, (J. D. Evans); No. 603, in the Canadian National Collection, Ottawa.

The species is closely allied to *alleniana* Fern. by the male genitalia; the spined side-arms of the gnathos are, however, much narrower and more pointed apically and there are differences in the shape of the transtilla and the baso-ventral portion of the claspers. Both these species agree closely with Pierce's figure of *viburniana* Fab. (Genit. Brit. Tort. 8, Pl. III) which this author places in the genus *Amelia* Hbn.

Trentonana is rather narrower winged and deeper in color than *alleniana*; this and the lack of maculation should distinguish it from its ally.

Tortrix flavidana sp. nov.

Palpi and thorax deep yellow; primaries pale yellow shaded with deeper color on inner margin; a large purple blotch in the cell, another at tornus and a small one on costa near apex of wing; slight purple shading near base of wing and a few purple striations between cellular blotch and inner margin. Secondaries whitish, shaded with smoky on inner half of wing. Expanse 26 mm.

Holotype—♀, Aweme, Man., July 6, (N. Criddle); No. 605, in the Canadian National Collection, Ottawa.

STUDIES IN CANADIAN DIPTERA

I. Revision Of The Asilid Genus Cyrtopogon And Allied Genera.

BY C. HOWARD CURRAN,
Ottawa, Ont.

(Continued from page 142)

Cyrtopogon montanus Loew.

Wholly black pilose except the head and legs, and in the ♀ the propleura. Abdominal pollinose bands of ♂ interrupted, of ♀ entire. Scutellum convex.

Length 12 to 16 mm. *Male.* Face rather strongly gibbose, more prominent above; yellowish grey pollinose; mystax yellow in the middle, the hairs fine, black laterally and below, the hairs stout, condensed above the oral margin so that they are very conspicuous; front less thickly pollinose, mostly sub-shining, the hair moderately thick, rather stout, long. Occiput whitish or pallidly yellowish grey pollinose, shining above, the hair black, long, beard white, the orbits black haired. Antennae black, thinly pale yellowish pollinose, with fine white hair; first joint twice as long as wide, second wider than long, about three-fifths as long as first; third over one-third longer than the first two combined, wholly more slender than the first, the basal half narrower; style nearly half as wide as third joint, widest at or beyond the middle, its apex not acute, the bristle very short; style not quite as long as first joint.

Thorax shining black, often chiefly shining behind, but in well preserved specimens with rather bright greyish yellow pollen, forming moderately complete 5, a slender middle vitta on the anterior half, the posterior margin broadly on the middle half, emitting a narrow stripe forward to the inner loop of the 5, and a small oblique spot inside the postalar calli; elsewhere the pollen is thinner and brownish, leaving the usual darker areas in many lights; pleura wholly thinly greyish or brownish yellow pollinose, but subshining or shining in most lights. Pile wholly black, moderately long and rather abundant, the bristles black; hairs on propleura with white apices. Scutellum convex, shining black, the disc basally yellowish pollinose. Hairs long, abundant, black, strong, no bristles.

Legs wholly black, the hind tibiae on the apical half and their tarsi basally usually piceous or piceous reddish. Pile of legs rather long and abundant, black, except as follows: all the femora below on the basal half, the posterior ones narrowly so on sub-apical half above, and the hind tibiae on the whole outer surface, best seen from basal view. Tarsi simple. Coxae chiefly white pilose, the front four on basal half of outer posterior half and the hind ones behind and in front with black pile.

Wings cinereous or yellowish cinereous, the furcation of the third longitudinal vein well beyond the apical crossvein.

Abdomen blue black, the posterior margins greyish pollinose, slightly wider laterally, broadly interrupted in the middle, wholly black pilose except a few hairs on the grey spots on the fourth and fifth segments, the discal pile short, that on the sides long and abundant; venter black pilose except the apex of the fifth segment.

Female. Mystax not quite so dense, the black hairs much less dense below.

Thorax with shorter more sparse hairs; sternopleura below and propleura white pilose; postalar calli shining black.

Tibiae all paler than in the male, sometimes reddish, or with blackish bases and elsewhere piceous reddish, or they may be only piceous with the bases darker, the hind ones paler; tarsi colored like the tibiae basally, blackish apically, but all the articulations reddish.

Second to fifth segments with greyish pollinose apices, the first two bands usually entire, sometimes narrowly interrupted, or all the bands may be entire, but the last two usually distinctly interrupted. Pile on disc short, black; on sides longer, black on bases of segments, white apically, but sometimes practically all black beyond the second segment, and always on the last three segments, where the pile is decidedly thinner and shorter.

Eleven specimens from British Columbia and Banff, Alberta, from May to June.

For two ♀ specimens, from Banff, Alta., 1911, (N. B. Sanson) and June 9, 1916, (C. G. Hewitt) with wholly white pilose lateral margins; I propose the name *latericaudus* new variety; type No. 585 in the Canadian National Collection, Ottawa.

Specimens of this species were compared with the types in the Museum of Comparative Zoology at Cambridge.

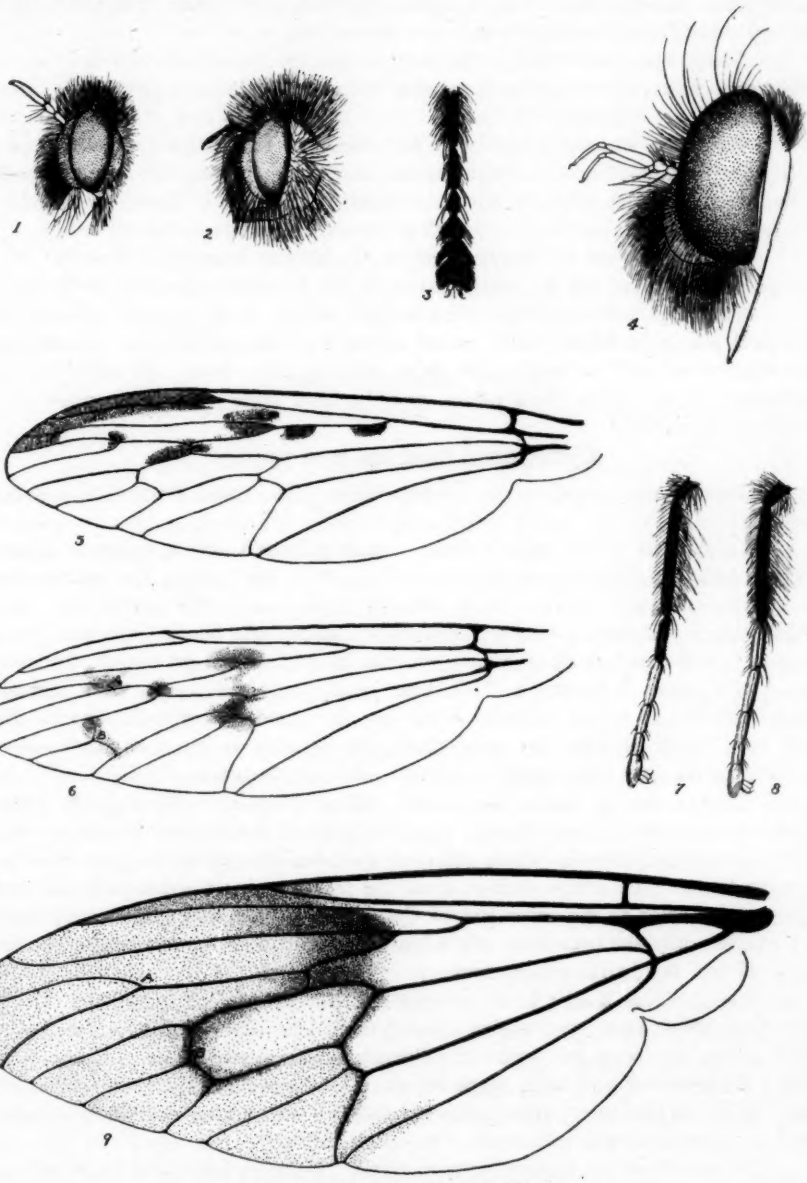
Cyrtopogon leucozona Loew.

Abdomen with complete greyish pollinose crossbands; trichostical pile white; abdominal pile whitish laterally except on bases of first, fifth and sixth segments; hind tibiae silvery white haired exteriorly.

Length, 10 to 15 mm. *Female.* Face moderately gibbose, most prominent on upper portion, yellow or greyish yellow pollinose; mystax yellow or whitish yellow in the middle, laterally and below with stouter black hairs, which are abundant just above the oral opening. Front lightly pollinose, wholly black pilose, the hair moderately long and fairly abundant. Occiput greyish pollinose, more shining above, black pilose, the beard whitish, the orbits wholly black haired. Antennae black, white haired; first joint one and one-half times as long as wide, rather stout, second as wide as long; third slightly more than one and one-half times as long as first two combined, rather slender, not as wide as first joint, narrowed on sub-basal half; style rather slender with parallel sides, as long as first joint, its spine short.

The thorax is not perfectly preserved, but appears to be marked as in *C. inversus*, only the pollen is more yellow. Pleura yellowish grey pollinose. Pile black, moderately long, but not very abundant, the posterior margin with white hairs, bristles rather fine, black; sternopleura and propleura with fine white pile, the trichostical pile yellow. Scutellum convex, shining black, the base yellowish pubescent; pile long, rather stout, black; no distinct bristles.

Legs black, hind tibiae and basal joints of their tarsi sometimes piceous reddish; femora wholly rather abundantly long, fine, white pilose, the hind ones



CYRTOPOGON AND ALLIED GENERA.

(1). *Cyrtopogon curtistylus* Curr., head; (2) . *C. willistoni* Curr., head; (3). *C. willistoni* Curr., mid-tarsus; (4) and (5). *Eucyrtopogon varipennis* Coq., head and wing; (6). *E. comantis* Curr., wing, *a*, branching of 3rd vein, *b*. discal crossvein; (7). *Cyrtopogon willistoni* Curr., mid-tarsus; (8). *C. praepes* Willist., mid-tarsus; (9). *C. curtistylus* Curr., wing.

beneath with stouter black hairs on apical third. Front four tibiae and all the tarsi black haired; hind tibiae beneath with long black hair, externally with silvery white hair, some of which are rather long.

Wings cinereous hyaline; the third longitudinal vein branches well beyond the discal crossvein; crossveins somewhat brownish. Halteres yellow, the stems fuscous.

Abdomen shining blue black, the second to fifth segments with a posterior grey pollinose band, narrower in the middle, usually entire or only obscurely interrupted, the last band usually interrupted. Pile short, black, on the sides longer, white, black on bases of fourth to seventh segments, or wholly white.

Described from ♀, Vasseau Lake, B. C., May 25, 1920, (W. B. Anderson), compared with type, and ♀, Aspen Grove, B. C., June 28, 1922, (P. N. Vroom).

The ♂ is not known and must be very similar to *C. inversus* but the trichostical pile is probably chiefly or all white; the females are very similar but the trichostical pile in *inversus* is about half or more black, the sides of the segments are all partly black pilose, and the hind tibiae bear much more conspicuous white hair.

Cyrtopogon inversus new species

Readily recognized by the silvery white pilose hind femora, tibiae and tarsi.

Length 10 to 16 mm. *Male.* Face gibbose, more prominent above, whitish yellow pollinose; mystax white, soft; stout, black along the mouth edge and a row of lateral hairs. Front shining black just on the middle line, elsewhere thinly yellowish pollinose; somewhat sunken; pile black. Occiput white pollinose; sub-shining; black-haired; on the lower half except against the eyes, fine white pilose. Antennae black, first joint short, half longer than second; second almost as broad as long, bead-like; third nearly twice as long as the first two, rather slender, not more than half as wide as the first; style about as long as the first joint, slender, acute. Hair on antennae black.

Thorax shining black, the pleura yellow pollinose. Mesonotum thinly brownish pollinose in some lights; on either side of the median line before the suture is a large yellowish white pollinose spot, its inner posterior edge concave, curving to meet the suture well in from the side margin; a small pollinose spot of the same color at the inner end of the suture. Pile black, moderately long, not coarse; only the pronotum white haired. Scutellum shining black, convex, black pilose, the hairs rather stout.

Legs shining black; front four femora thinly white pilose below; thickly long black pilose above and behind; hind femora long silvery white pilose above; black pilose in front and behind; yellowish white pilose below. Front four tibiae black haired and with black bristles; hind ones thickly black pilose on inner side; on the outer with silvery white pile, which does not form a crest; hind tarsi with silvery white pile above, not crested.

Wings cinereous hyaline; stigma black. Halteres black, the knob yellow.

Abdomen shining black, the second to fifth segments with the posterior margins grey pollinose; the band on the fifth broadly interrupted, the others slightly narrowed in the middle. Pile black; long laterally; just a few white hairs on the sides of the first segment.

Female. Front grey pollinose. The whitish grey pollen forms complete "5's" on the mesonotum, and there is a faint whitish stripe on the median line in front; the whole border, a transverse spot before the scutellum which projects forward in the middle and the disc of the scutellum are whitish grey.

Middle femora with less white pile below; hind femora and tibiae with the silvery pile a little less evident, their tarsi wholly lacking it.

Abdomen with shorter pile, the first grey band often narrowly interrupted; sixth and seventh segments entirely shining black.

Holotype, ♂ Aspen Grove, B. C., June 15, 1922, (P. N. Vroom); No 572, in the Canadian National Collection, Ottawa.

Allotype, ♀ same locality and collector, June 28, 1922.

Paratypes, ♂, Darcy, B. C., May 14, 1918, (W. B. Anderson); ♀, Chilcotin, B. C., June 7, 1920, (E. R. Buckell), ♀, Nicola, B. C., June 6, 1922, (P. N. Vroom); ♀, Hadley, B. C., May 15, 1920, (W. B. Anderson).

Cyrtopogon falto Walker

Legs plain; basal third of the tibia reddish yellow, the remainder black; mystax yellow.

Length, 12 to 17 mm. *Male.* Face strongly gibbose, more prominent on the upper half; thickly clothed with yellow or greyish yellow pollen; mystax composed of long, moderately fine, yellow hairs, along the oral margin and a lateral row on the lower half, with more bristly black hairs. Front shining in the middle and against the ocellar tubercle; with similar pollen to that on the face; pile black. Occiput grey pollinose, shining above; black haired above, fine white haired below, even against the eyes on the cheeks. Antennae black, with thin brownish yellow pollen; hairs black; first joint three times as long as wide, its apex a little larger, second one and one-half times longer than wide, sub-triangular in outline, half as long as first joint; third nearly one-fourth longer than the basal two combined, just beyond the middle a little wider than the second joint; style almost as long as second joint, acute, not robust.

Thorax with the lateral margins, an elongate, oval, in front of the scutellum on either side and a rectangular spot beneath the wings, shining black; mesonotum covered with brownish golden pollen; a broad geminate median stripe and a lateral spot commencing well before the suture, darker, brownish. Pleura with the pollen greyish yellow or greyish. Pile black, rather long, not abundant; bristles evident; propleural and trichostical pile white. Scutellum tawny pubescent basally, convex, shining black; stout black haired.

Legs black; basal third of the tibiae, basal half or more of the first three tarsal joints and less than half of the last two joints, reddish yellow. Pile of front and middle femora almost all rather long, black, above, a few pale hairs towards the base; below with rather conspicuous yellow or whitish yellow pile; tibiae black haired; the middle ones with some short brassy yellow hairs behind, but these not conspicuous; front and hind tibiae with brassy yellow pubescence; tarsal pads yellow. Bristles of legs black.

Wings hyaline, sometimes a little greyish apically. Halteres yellow.

Abdomen shining black; second to sixth segments each with a small subtriangular greyish spot in the posterior angles. Pile yellow, paler and longer basally; on disc of fifth and following segments and on the genitalia, black.

Female. Mystax thinner; with more black hairs along the sides and above. Tarsal joints with only the broad bases reddish yellow. Sixth abdominal segment without grey pollinose spot.

Thirty-five specimens from Quebec, Ontario and Manitoba.

Readily recognized by the strongly bicolored tibiae.

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OBSERVATIONS ON THE OVIPOSITION OF SENOTAINIA TRILINEATA V. DER WULP*

BY C. HOWARD CURRAN,
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A specimen of *Senotainia trilineata* Van der Wulp, and a female specimen of *Ammophila communis* Cresson, have been received from Mr. W. R. Buckell, of Salmon Arm, B. C., together with observations on the manner of oviposition of the former. There is some doubt about the identity of the wasp in question, as the specimen observed provisioning the burrow was not captured and a specimen, "evidently the same species," was sent for determination. My own observations on this interesting method of oviposition were made near Lawrence, Kansas, in 1922, and while the actions of the principals concerned were practically identical, the wasp was *Sphex conditor* Smith. *Senotainia trilineata* is recorded by Aldrich as reared from *Sphex speciosus* Drury. I cannot find any reference to the manner of oviposition.

Mr. Buckell's attention was first attracted by the wasp dragging a cutworm along the roadside and its burrow was discovered about two feet away. The greater part of an hour was spent by the wasp in dragging the cutworm to the burrow. The larva was left at the surface while the burrow was entered, and the grub then dragged in after the wasp. While this was taking place four or five small flies were observed in the vicinity of the opening. The wasp drove these away before commencing to scratch in and pack the earth at the mouth of the tunnel, but while engaged in this operation one of the flies darted to the edge of the hole, turned its back and dropped an egg, which was scratched down along with the loose earth. The egg was not discovered, as the soil was full of white particles.

The process described by Mr. Buckell is almost identical with observations made by P. A. Readio and myself at Lawrence. In our case, however, only a single fly was present and this hovered in the air just above the scratching wasp and dropped an egg, which we were able to observe quite clearly as it fell, but could not discover later. While the fly in question was captured, it was not determined, but apparently was the same species. Specimens of *S. trilineata* from Manitoba, Alberta, Fort Simpson, N.W.T., British Columbia and Ontario, are before me.

We were not successful in rearing the wasp nor the fly, although all the loose soil was placed about the cutworm larva. Whether the fly is parasitic upon the wasp or merely feeds upon the caterpillar is yet to be learned.

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*—Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.